

### **REMARKS**

In the Office Action, claims 1-3, 13-16, 26-29 and 39 were rejected. All of the pending claims are believed to be allowable over the prior art references cited by the Examiner. Reconsideration and allowance of all pending claims are respectfully requested in view of the arguments summarized below.

### **Rejections Under 35 U.S.C. § 102**

In the Office Action, claims 1-3, 13-16, and 26 were rejected under 35 U.S.C. §102(b) as being anticipated by Webber, U.S. Patent No. 6,081,577. Anticipation under 35 U.S.C. § 102 requires a showing that each limitation of a claim is found in a single reference, practice or device. In re Donohue, 226 U.S.P.Q. 619, 621 (Fed. Cir. 1985). Applicants respectfully assert that the present invention, as recited in independent claims 1, 13, 14 and 26 is patentable over the Webber reference.

Applicants' position with respect to the Webber reference can be summarized as follows. Independent claims 1, 13, 14 and 26 recite, in generally similar language, *acquiring views of an object from at least two projection angles to generate projection datas of the object, backprojecting the views across an imaged volume to generate backprojected data, and processing the backprojected data using a non-linear operator to generate a three-dimensional dataset consisting of a plurality of images representative of the imaged object. All the claims require (1) the backprojected data to be processed(2) using a non-linear operator.*

Webber discloses using a non-linear operator but *never in combination* with backprojection operation. In other words, Webber discloses using either backprojection (linear tomosynthesis) or minimization (non-linear tomosynthesis) but not both. Webber states,

When a linear combination (backprojection) of the first and second data images is performed, the image intensity at the same relative position of both data images is averaged. For example, relative position B in one data image corresponds to relative position E in the other data image and, therefore, the corresponding relative position in the tomosynthetic image is assigned an intensity equal to the average of the intensity measured at relative position B and relative position E (i.e.,  $(B+E)/2$ ). As a result, the tomosynthetic image 1150 is marked by a blurring of the image produced by the first radiopaque object 1140. However, when a non-linear combination of the first and second data images is performed, both data images are compared and, for example, only the minimum intensity at each relative position is retained. For example, relative position B in one data image corresponds to relative position E in the other data image and, therefore, the corresponding relative position in the tomosynthetic image is assigned an intensity equal to the lesser of the intensities measured at relative position B and relative position E (i.e., B or E). As a result, the blurring shadows are eliminated from the tomosynthetic image 1152. Column 22, lines 9-47; *See also*, FIG. 24(a) and (b).

Clearly, Webber discloses two different techniques for generating a tomosynthesis image. When the non-linear operation is performed, it is not on the backprojected data. As described in Webber, the non-linear operation (minimization) is preferred over the linear operation (backprojection) as the non-linear operation reduces blurring artifacts. *See*, column 22, line 48 – column 23, line 19.

Applicants respectfully assert that *there is no teaching or suggestion that the backprojected data are being further processed via a non-linear operator as claimed in the present application*. In fact, Webber teaches that one skilled in the art may not need a backprojection technique at all and may just rely on the non-linear combination of the projection images to generate a tomosynthesis image for diagnosis. *See*, column 28, lines 14-31. Specifically, Webber states that

This approach is very efficient: it is simpler to implement than conventional tomosynthetic back-projection methods; and it produces sharp-appearing images that do not require additional computationally

intensive inverse filtering or iterative deconvolution schemes. Column 28, lines 20-24.

In contrast, the claimed processing uses a backprojection technique on the acquired projection images to generate backprojected data. The backprojected data is further processed via a non-linear operator to generate a three-dimensional dataset representative of the imaged object.

In the Office Action, the Examiner summarized Applicants' position with the statement: "[a]s described in Webber, the non-linear combination (minimization) is preferred over linear combination (backprojection) as the non-linear combination reduces blurring artifacts". However, Applicants submit that the Examiner has over-simplified and mischaracterized the Applicants' position. The Applicants respectfully assert that, in Webber, the non-linear operation used without backprojected data is preferred over the linear operation (ordinary backprojection).

The Examiner further misread and misapplied the Webber reference. The Examiner stated that "Webber teaches in Fig. 24B generating backprojected data from elements 1146 and 1148 into their corresponding addresses or locations. The backprojected data are then processed with a non-linear operator to generate a 3D dataset." However, the Applicants respectfully submit that, as noted above, Fig. 24B does not teach backprojection at all. Fig. 24 B only illustrates or teaches using a non-linear operator (minimization) on an image dataset. The value of the operation "minimum of (A or B)" noted in Fig. 24B (a non-linear operation) is not same as the value of the operation " $(A+B)/2$ " noted in Fig. 24A (which is clearly a linear operation). The Examiner inconsistently but correctly states in subsequent lines that the Webber reference does not teach processing the image dataset (resulting from projection images) with a linear operator and then further processing the linear-operated results with another non-linear operator. This statement clearly brings out the distinction between Webber and

the present Application. *The present invention as recited in all of the independent claims begins with backprojecting the image dataset to generate backprojected data and then processing the backprojected data using a non-linear operator to generate a three-dimensional dataset.*

At least because *Webber does not disclose or suggest a technique that involves processing the backprojected data using a non-linear operator*, as claimed, the reference cannot anticipate claims 1, 13, 14 or 26. Claims 2-3 and 15-16 depend directly or indirectly from claims 1 and 14 respectively. Accordingly, the Applicants submit that claims 2-3 and 15-16 are allowable by virtue of their dependency from an allowable base claim. Applicants also submit that the dependent claims are further allowable by virtue of the subject matter they separately recite. Thus, it is respectfully requested that the rejections of claims 1-3, 13-16 and 26 under 35 U.S.C. §102(b) be withdrawn.

#### **Rejections Under 35 U.S.C. § 103**

Claims 27-29 and 39 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Webber* in view of *Stanton et al.*, U.S. Patent No. 6,744,848. Independent claims 27 and 39 include similar recitations as claims 1, 13, 14 and 26 and require *the backprojected data to be processed using a non-linear operator*. At least because *Webber*, as discussed above, fails to teach or suggest processing the backprojected data using a non-linear operator, and as none of the remaining references were argued to do so, the Applicants submit that a *prima facie* case of obviousness is not supported against claims 27-29 and 39 for rejection under 35 U.S.C. §103(a). Thus, it is respectfully requested that the rejections of claims 27-29 and 39 under 35 U.S.C. §103(a) be withdrawn.

**Conclusion**

In view of the remarks and amendments set forth above, Applicants respectfully request allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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